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Cell adhesion and mechanical stimulation in the regulation of neuronal induced mesenchymal stem cell differentiation.afm measurements

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In this study, we report on the synthesis and characterization of a 3D Nanosubstrate as a support platform for Mesenchymal Stem Cell Differentiation into Neuronal Stem Cells and Myocardic stem cells. The nanosubstrate was produced by combining a poly ethylene glycol (PEG)-b-poly allylglycidyl ether (PAGE) copolymer matrix with gold-coated collagen nanofibers. We show that the surface topography of a nanosubstrate plays an essential role in the regulation of cell adhesion, proliferation, and differentiation of Mesenchymal Stem Cells. To investigate the influence of the mechanical properties on the differentiation process, Atomic Force Microscopy along with *in-vivo* differentiation studies were performed. We found that the interconnectivity, architecture and surface topology of the polymer has an effect on the neuronal and cardiac differentiation potential of the Mesenchymal stem cells.

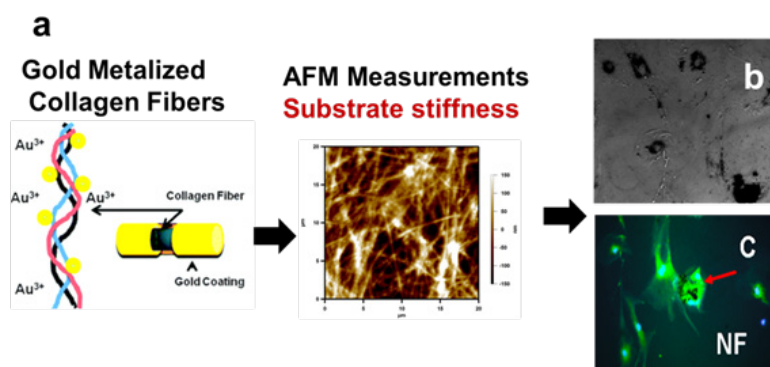


Figure 1. The Collagen metallized fibers from the substrate along with the substrates mechanical properties measured by AFM (a) Neuronal induced Differentiation of Mesenchymal Stem Cells on the stiff substrate (b,c)

Biography

Anamaria Orza focuses primarily on the area of development of innovative architectural nanocomposites for biomedical applications. Prior to her arrival at Emory in the fall of 2013, Dr. Orza served as a postdoctoral researcher at the Center for Integrative Nanotechnology Sciences at the University of Arkansas at Little Rock. Dr. Orza has been recognized as a European Union fellow, receiving her PhD in Chemistry from Babes Bolyai University, Romania and working in close collaboration with Liverpool University, United Kingdom. Dr. Orza has authored and co-authored 2 patents and over 32 papers in leading journals and at leading international conferences in the field (with over 170 citations) and 2 book chapters in the fields of Applied Nanotechnology in Cancer Research and Tissue Engineering.

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